

DCV-LCb Circular and DCV-LCb Rectangular.

INTRODUCTION

DCV-LCb is part of Lindinvent's series of smart and installation-efficient dampers and measuring devices for protective ventilation and climate control at workplaces.

FUNCTIONS

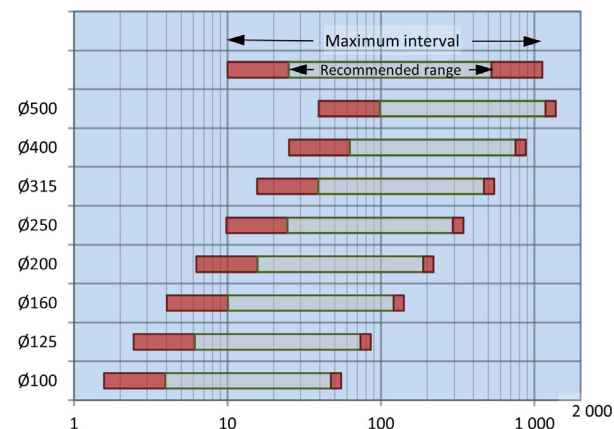
DCV-LCb consists of a damper with measuring flange, a damper actuator, and lab climate controller LCXb. The unit cooperates with other control equipment via a local network (CAN loop) to maintain air quality and room temperature.

CIRCULAR OR RECTANGULAR

DCV-LCb Circular (Ø100-500 mm) is delivered as a complete unit with all constituent parts connected. DCV-LCb Rectangular is supplied in parts to be assembled on-site. DCV-LCb Circular is available in the database for MagiCad. DCV-LCb Rectangular is drawn as damper JSPM and measuring unit SMRD.

See page 2 for a presentation of included parts.

QUICK GUIDE: FLOW RANGES FOR DCV-LCb CIRCULAR



Flow range [l/s] for each size of DCV-LCb Circular.

AIRFLOW MEASUREMENT AND CONTROL

Circular & Rectangular

Measurement range: 0.5 to 6.0 m/s

Maximum range: 0.2 to 7.0 m/s

Measurement accuracy: $\pm 5\%$ or at least $\pm x$ l/s (where x is the duct area in dm²)

Airflow calculation (q): $q = k \cdot \sqrt{\Delta p}$ [l/s]

k-factor Rectangular

Calculate k as follows:

$k = 749 \text{ times } A$ where $A = \text{Width}(W) \text{ times Height}(H)$ with measures W and H in meters

An example: $\text{SMRD } 500 \times 200 = 749 \cdot 0,5 \cdot 0,2 = 74,9$

k-factor Circular

The k-factor can be read from the damper or from the table in the product description for SPMF.

PLACEMENT IN DUCT

For accurate airflow measurement, DCV-LCb must be correctly oriented in the airflow direction and preceded by an interference-free straight duct section corresponding to a length of 3.5 times the duct diameter.

When DCV-LCb is placed after a silencer, with a different cross-sectional area, DCV-LCb must be preceded by a straight duct section corresponding to 2.0 times the duct diameter where the length of the silencer is not included.

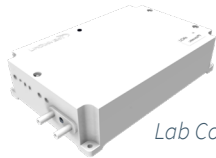
For DCV-LCb Rectangular, the required interference-free length is calculated by multiplying the equivalent duct diameter(d_e) calculated via the formula: $d_e \approx 1.15 \text{ times } \sqrt{A}$, where $A = \text{Width}(W) \text{ times Height}(H)$

After DCV-LCb, no minimum distance to a subsequent bend or other disturbance is required.

CONSTITUENT PARTS

The products below are included as parts of DCV-LCb. The damper and measuring flange are either circular or rectangular. See the product description for more complete technical specifications.

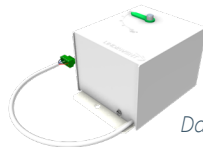
DCV-LCb and Its Constituent Parts



Lab Controller LCXb.

Lab climate controller - LCXb

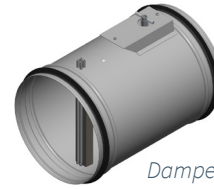
- Integrated digital airflow sensor
Note: A presence detector and other sensors must be ordered separately
- CAN connection
- IP-class: IP53
- temperature limits
Operating : 0°C to 40°C; <85% RH
Storage: -20°C to 50°C; <90% RH
- Weight: 0.4 kg
- Operating modes:
 - Flow zone slave with compensation
 - Flow zone master with compensation
 - Flow zone slave without compensation



Damper Actuator DBA.

Damper actuator - DBA

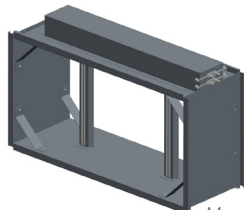
- Included in DCV-LCb Circular
- Supplied as part to DCV-LCb Rectangular
- Microprocessor controlled BLDC motor
- Indicator pin to show the damper opening angle
- IP-class: IP42 (mounted on the actuator holder)
- Temperature limits
Operating : 0°C to 40°C; <85% RH
Storage: -20°C to 50°C; <90% RH
- Weight: 0.9 kg



Damper SPMF.

Circular damper with measuring flange - SPMF

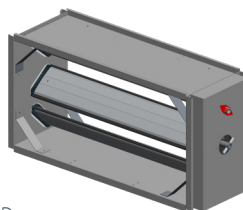
- Included in DCV-LCb Circular
- Measuring flange with double measurement points
- Full damper blade
- Actuator shelf adapted for Lindinvent's damper actuator
- Tightness class 3 according to VVS AMA
- Pressure class A according to VVS AMA
- Weight: After damper size (1 to 10 kg)



Measuring Flange SMRD.

Rectangular measuring flange - SMRD

- Supplied as part to DCV-LCb Rectangular
- Measuring flange with double measurement points
- Case and measuring flanges of galvanized sheet steel C3(C5)
- Measuring tubes of aluminum C4(C5)
- Weight: After size (2 to 20 kg)



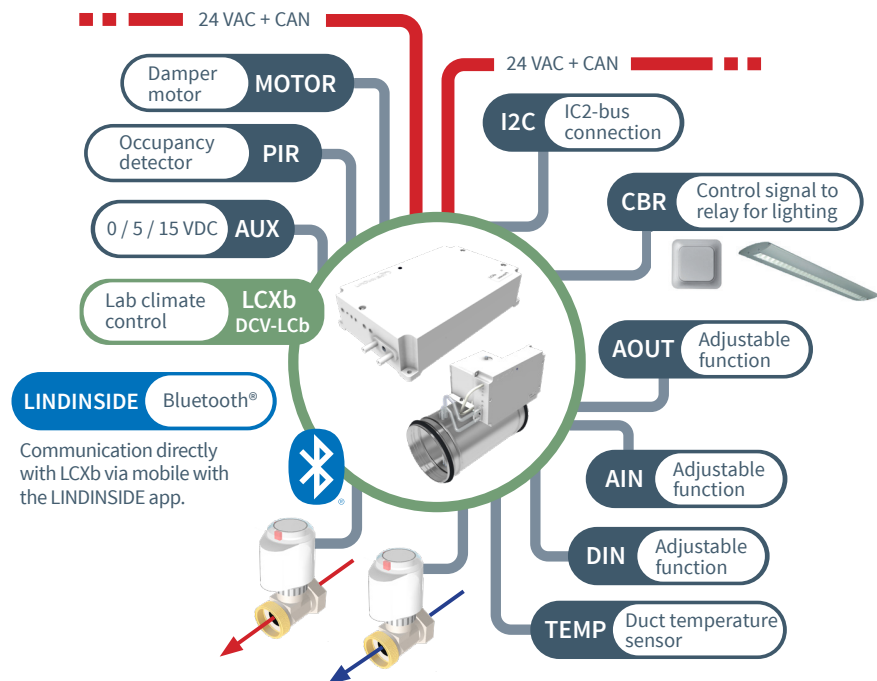
Damper JSPM.

Rectangular damper - JSPM

- Supplied as part to DCV-LCb Rectangular
- Opposed blade damper
- Actuator shelf adapted for Lindinvent's damper actuator
- Case of galvanized sheet steel C3(C5)
- Damper blades of aluminium C4
- Tightness class 2 according to VVS AMA
- Pressure class A according to VVS AMA
- Available with circular connection with size 700x700 or 800x800
- Weight: After damper size (3 to 40 kg)

CONNECTION DIAGRAM

CAN and 24 VAC are connected to LCXb, included as part of control unit DCV-LCb, using a shielded 4-wire cable. Two conductors are used for CAN and two for voltage supply. The same type of cable is used for accessories.



FUNCTIONS VS INPUT AND OUTPUT SIGNALS

Equipment connected to AIN, AOUT or DIN is activated by selecting a pre defined function, with our without parameters that adapts signals.

CONNECTIONS

- Two terminals for 24 VAC + CAN.
- Terminal for 0-10 VDC AIN and AOUT (dedicated for the damper actuator)
- Terminal for AIN2 and AOUT2, General 0-10 VDC
- Terminal for generic power supply (AUX: 0, 5, 15 VDC)
- Terminal for lighting box CBR
- Terminal for duct temperature sensor (an accessory not normally supplied with LCXb)
- Terminal for DIN1: PULL-UP [+5V] alt. 0-5 VDC
- Terminals for Triac 1 and Triac 2 for 24 VAC
Maximum number of 1W valve actuators is 6W
- Terminal for I2C-bus
- Module for Bluetooth®

WAYS TO COMMUNICATE

Look for details about a specific interface via it's product name and product description.

- Logging in to the controller via mobile phone and the LINDINSIDE app
- Lindinvent's central unit with LINDINSPECT® via Gateway NCE
- An external parent system through Gateway NCE and ModbusRTU or ModbusTCP

TROUBLESHOOTING AND ALARM NOTIFICATION

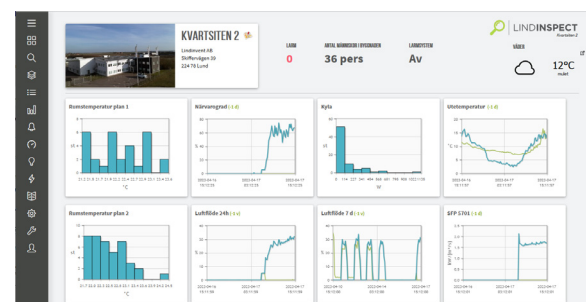
Systems with LINDINSPECT®, see below, continuously log operational data such as air flows and temperatures. An alarm flag is set in case of deviation. The availability of visualized operating data enables effective troubleshooting. Deviating values are noticed and analyzed.

EASY COMMISSIONING

The internal air flow sensor is delivered factory calibrated. In connection with commissioning, only a few control variables are requested, including the current duct diameter or the k-factor.

VISUALIZATION WITH LINDINSPECT®

LINDINSPECT® is a powerful web-based tool that is part of the system software that enables a central and coordinated optimization, administration and visualization of everything from control units to supplementary systems for comfort and sustainable energy use in buildings.



Detail from the start page in LINDINSPECT® where climate control can be visualized and administered.

FUNCTIONAL DIAGRAM

Laboratory with DCV-LCb

A solution with extract air and room climate control via DCV-LCb. DCV-BLb is used for supply air control.

DCV-BLb

- Measures the supply air
- Retrieves the total extract air reported by DCV-LCb
- Regulates the supply air to balance the reported total extract air

DCV-BLb is commissioned for airflow balancing.

DCV-MFb

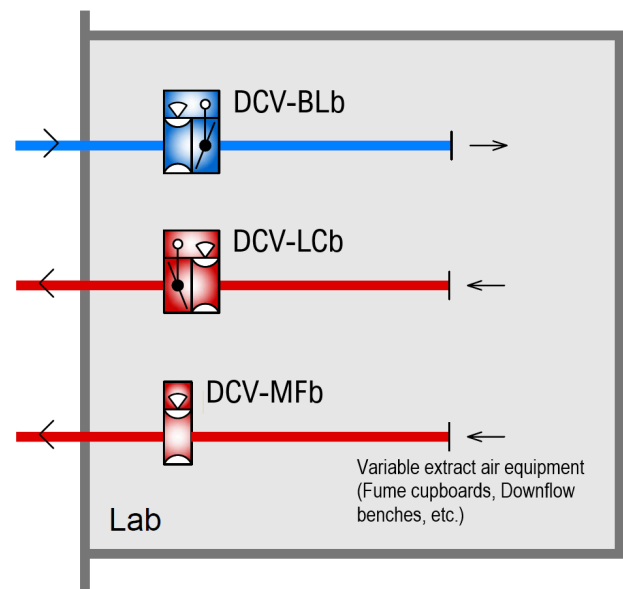
- Measures the extract air
- Reports the measured total extract air from the laboratory's extract air units

Controller FBLb, which is part of DCV-MFb, is commissioned for pure airflow measurement.

DCV-LCb

- Regulates the extract air to maintain setpoints for room temperature etc
- Reads the reported extract air from DCV-MFb
- Sums up the total extract air in the zone, here the laboratory
- Reports the total extract air in the zone, here the laboratory

DCV-LCb is operated as slave unit with compensation in relation to DCV-BLb. This is the default function for DCV-LCb.



Example of function diagram with DCV-LCb.

EXAMPLES OF ACCESSORIES

Flow Balancing

See Airflow control unit DCV-BLb for balancing of airflow.

Sensor for Air Quality

See Lindinvent's series of duct, wall or ceiling mounted sensors for room temperature and carbon dioxide.

Lighting Control Box

Lighting can be controlled via occupancy detector or manually via push button by connecting lighting box CBR. See controller SBDb for lighting control via DALI.

Electric Radiator Control Box

Heating batteries or electric radiators can be controlled. See the I/O-product CBT.

Air Fan Cooling Control Box

Control additional cooling via control boxes CBF-E or CBF-S.

External Occupancy Detector

For an occupancy detector see PD-2400 or GO-C.

Setpoint Switch Panel

The wall-mounted panel DRP can be installed to adjust the room temperature setpoint or temporarily activate enforced ventilation. See also INOFFIX below.

Smart Electrical Outlets with Power Measurement

Via the occupancy detector and Bluetooth®, the Smart-plug SPB can reduce the tenant's electricity usage by on-demand control of workplace lighting, screens, and electric desk lifts, etc. The Product is not yet released.

ORDER INFORMATION

DCV-LCb Circular (Ø100-500 mm)

Lab climate control unit, Lindinvent AB,
DCV-LCb-[Damper][Material]-[Colour]

Damper SPMF: 100, 125, 160, 200, 250, 315, 400, 500

Material:

- Galvanized sheet steel (C3)
- Stainless acid-resistant sheet steel (C5)
- Epoxy-coated sheet steel (E)
- Powder-coated sheet steel (P)

Omitted material specification: Galvanized (C3)

Colour: RAL9003 (standard)

To be stated only for E and P. Other colours and gloss levels can be ordered.

Example:

- DCV-LCb-250C3
(Circular DCV-LCb galvanized)
- DCV-LCb-250P-RAL9003
(Powder-coated RAL9003)

DCV-LCb Circular (Duct Connection Ø630 mm)

Lab climate control unit, Lindinvent AB,
DCV-LCb-630(700x700)[Material] or
DCV-LCb-630(800x800)[Material]

Size: 700x700 or 800x800 available

Material: Galvanized (C3)

Example: DCV-LCb-630(700x700)C3

DCV-LCb-630 is delivered as a construction kit. The rectangular damper JSPM 700x700 mm with circular connection 630, a circular measuring flange with diameter 630 mm, controller LCXb and damper actuator DBA are delivered separately to be installed on site.

DCV-LCb Rectangular

Lab climate control unit, Lindinvent AB,
DCV-LCb-[WxH][Material]

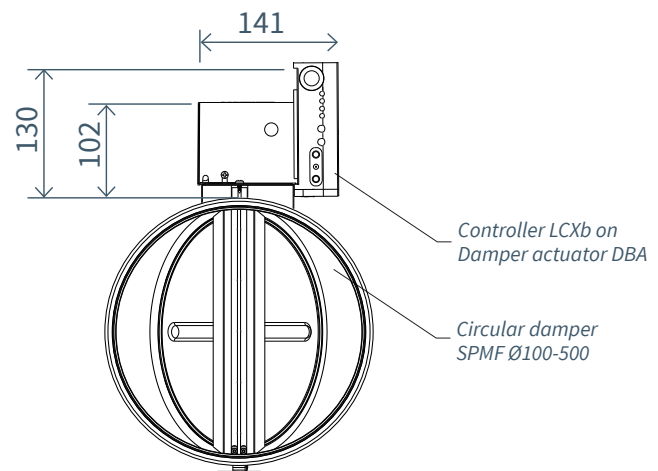
Standard sizes WxH: from 200x200 mm to 1600x1000 mm
Width(W): from 200 to 1000 mm in intervals of 100 mm,
then in intervals of 200 mm
Height(H): from 200 to 800 mm in intervals of 100 mm,
then in intervals of 200 mm
Contact Lindinvent if you need non-standard dimensions.

Material: Galvanized(C3)

Example: DCV-LCb-600x300C3

Rectangular DCV-LCb is delivered as a construction kit where damper JSPM, measuring flange SMRD, controller LCXb and damper actuator DBA are delivered separately to be installed on site.

DIMENSIONS in mm



Dimensions of a mounted circular DCV-LCb.

COMPLEMENTARY DOCUMENTATION

Document can be viewed on the product page at www.lindinvent.com

Document	Comments
Installation instructions	Combined installation instructions for DCV-LCb and lab climate controller LCXb (mounting + connection).
Operation instructions	Short presentation of LINDINSIDE and control variables.
Maintenance instructions	Considered maintenance free. For cleaning and control measurement of the flange, see the maintenance instructions for SPMF.
External connection diagram	Shows how conductors from equipment are connected to LCXb.
Environmental product declaration	For assessment at Byggarubedömningen in Sweden.
Modbus list	Last entry in the modbus list for LCXb.
AMA-text	Available.